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Montana GIS News

Natural Resource Information System, Montana State Library Volume II, No. 2, Fall 1991

Fourth Annual Montana GIS Conference

The Fourth Annual Montana GIS Conference: *Plans to Practice* will be held in Bozeman December 3 - 5. The hosts for this year's conference are the Department of Earth Sciences, Department of Plant and Soil Science, and Geographic Information and Analysis Center at Montana State University.

The Conference has grown from a group of 90 in 1988 to over 330 users at last year's conference. Sessions will be held jointly at the Holiday Inn and GranTree Inn.

We're excited to have Jack Dangermond, the founder and president of Environmental Systems Research Institute (ESRI), give the keynote address on Wednesday. Dangermond was a pioneer in the GIS field, founding the company which manufactures Arc/Info software in 1969. Dangermond is recognized in both academia and industry as a leader and authority in the GIS field. At the Montana conference, Dangermond will talk about public access to GIS.

Conference plenary sessions include presentations on determining when a GIS is needed, and on the institutional and technical challenges of implementing and operating a GIS. There will also be a wide range of concurrent sessions, covering topics such as natural resources, city/county applications, and GIS operational challenges.

Commercial vendors will be on hand to exhibit GIS hardware, software, and services. Open house sessions and demonstrations will be hosted by MSU and the Soil Conservation Service.

A special feature this year is a GIS Public Session, which corresponds with Geography Week in Bozeman. The event is scheduled for Tuesday evening at the Holiday Inn. The session is free, and anyone in the Bozeman area is welcome to attend. GIS will be explained in lay terms for the general public, and the Montana State Library will announce its plan to bring GIS to Montana libraries. GIS applications will be demonstrated. Poster exhibitors and vendors are encouraged to participate in this public education event. Please contact the NRIS program (406-444-5354) if you are interested in participating.

There will be pre-conference workshops all day on December 3. Scheduled workshop topics are: *Introduction to GIS: Basic Concepts; Federal Spatial Data Transfer Standards; Cartography and GIS; Global Positioning Systems and GIS; GIS in City and County Government; Introduction to GIS: 'Hands-on' Applications; and Terrain Analysis and GIS*. Most of the courses are in the $25 to $40 range. The exception is the *Introduction to PC ARC/INFO*, course, hosted by MSU, which is a 3-day ESRI-certified training course scheduled for December 1 - 3, at a cost of $520.

Cost of the conference is $50 for those who register by November 22. After this date, the cost will be $65. Checks should be made payable to "Montana State University" and sent to Diana Cooksey, Department of Plant and Soil Science, MSU, Bozeman, MT 79715. (406-994-5684). Conference enrollment is limited to 350, so please register early. For more information contact:

John Wilson
Department of Earth Sciences
Montana State University
Bozeman, MT 59717
(406)994-6907 ■

Montana GIS Standards Plan

The charter of the Montana Interagency GIS Technical Working Group (TWG) calls for the development and compilation of "data standards for the common base map themes depicting public land lines, hydrography, transportation, and ownership" and to investigate "methods and priorities towards the creation of a statewide transferable digital database." These charges have resulted in the development of a *GIS Standards Plan* for Montana. Beginning with the May TWG meeting in Pablo, the group reviewed other standards plans, and developed objectives and an outline for the *Montana GIS Standards Plan*. The plan now includes sections on: GIS spatial data standards, data transfer methods,

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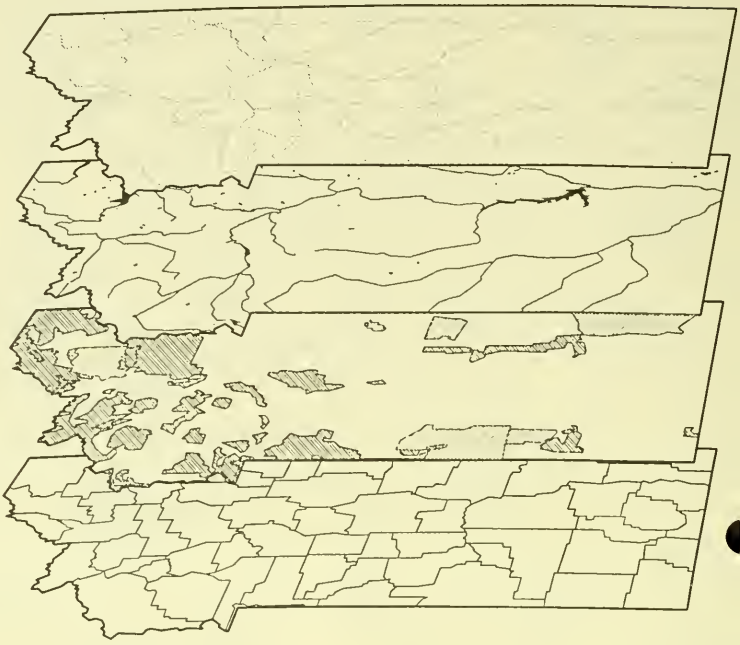
data documentation, state-wide base layers, project and data coordination, and ethical considerations.

While standards for projects are determined by need and the amount of money available, a minimum level of standards is proposed to facilitate data sharing. Standards, along with documentation, will provide the end user with a history of the data accuracy. Standards will also provide credibility to the agency and the data by preventing misuse of the data. Ideally, the plan will also serve as a guide for new GIS development.

The final draft of the *Montana Standards Plan* will be distributed at the December GIS Conference in Bozeman for review and comment. These comments will be reviewed by the TWG and a final version of the plan will be adopted at the winter 1992 TWG meeting. There will be a panel discussion and presentation at the Bozeman conference to provide an overview of the plan as well as background on the issues and decisions that went into the plan development. ■



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Montana GIS News
Natural Resource Information System
Montana State Library
1515 East 6th Avenue
Helena, MT 59620
(406) 444-5354

GIS User Group Seeks Support for Incorporation

The Montana GIS User Group was formed in 1988, when 40 people attended what had been scheduled as a data processing subcommittee meeting for five people. The User Group has since grown to include a wide range of Montana's governmental agencies, private businesses, and universities involved with GIS technology. By 1989, the group was more than four times as large, with 180 users attending the conference in Billings. A proposed charter was presented to the more than 300 people at last year's GIS Conference in Missoula. (See the Special Conference Edition of the *Montana GIS News* for the charter.) The charter proposed that the User Group publish a quarterly newsletter, sponsor the annual conference, and support activities designed to share information on GIS. Members agreed to ratify the charter and responded with an emphatic "Yes!" when asked if we should proceed with incorporation.

The User Group has been a loosely-knit group for three years. It is now at a point where a more formal

status is necessary. To begin with, it needs to consider how to handle taxation on Group funds, which currently have a balance of about $3800.00. If the Group is incorporated, it can obtain non-profit status.

In Montana, the incorporation process is relatively simple. A nonprofit corporation is defined under Montana statute as "a corporation, no part of the income or profit of which is distributable to it's members, directors, or officers" and such "corporation may be organized...for any lawful purpose(s)." In order to acquire a certificate of incorporation, the group must elect a board of directors. Upon receipt of the certificate of incorporation, the organization must formulate bylaws. Then the organization may apply for non-profit status.

At the GIS Conference in Bozeman, December 3 - 5, it is proposed that the User Group elect a minimum of seven and a maximum of nine people to serve on the board of directors. The directors should represent a cross section of GIS users in the state, including the following: local, state, and federal government, non-profit organizations, academic institutions, and the private sector.

The new board will elect a president, vice-president, and secretary-treasurer at their first meeting. One of their first tasks will be to draft and finalize by-laws to aid the Group in attaining non-profit status. The by-laws will be presented at the 1992 conference. Non-profit status will allow the User Group to achieve tax exempt status.

While the association will still be a loosely-knit group, we anticipate that members of the GIS User Group board will serve a variety of functions, such as providing representation on the Technical Working Group (TWG), participating in planning the yearly GIS Conference, drafting and implementing the bylaws, and furthering the development of GIS technology in Montana. As GIS becomes more widespread in the state, the role of the GIS User Group will become more critical. The Group will have input on decisions which would affect all GIS users in the state, such as the Montana Standards Plan.

Anyone interested in serving on the for the User Group Board of Directors should contact the NRIS program by December 2. Inquiries may be directed to NRIS at the Montana State Library, 1515 East Sixth Avenue, Helena, MT 59620, Phone 444-5354. ■

State Mapping Advisory Committee Update

The State Mapping Advisory Committee (SMAC), a subcommittee of the Montana GIS Interagency Technical Working Group (ITWG), met on August 22 in Helena to establish Montana's mapping priorities to the U.S. Geological Survey (USGS) for their consideration in the FY 1992 workplan. With input from several agencies, first and second priorities were established for three map types: 1) 1:100,000 intermediate scale topographic maps; 2) 1:24,000 scale Digital Line Graphs (DLGs) and Digital Elevation Models (DEMs); and 3) Orthoquads.

The USGS asked the SMAC representatives to select either the 1:100,000 or the 1:24,000 scale data as a state wide mapping priority. The SMAC members noted that while the intermediate scale 1:100,000 mapping is appropriate for state wide projects, many agencies have specific project needs for 1:24,000 digital data sets. The SMAC recommended to the USGS that the 1:24,000 scale mapping should be done in conjunction with the 1:100,000 mapping. The SMAC recommended 20 1:100,000 map revisions, and over 50 1:24,000 quads as a first priority for digital map products this year. There will be a display and report at the GIS Conference in December presenting the mapping priorities as developed by the SMAC.

SMAC Chair, Don Cromer, Department of Transportation, prepared and submitted Montana's input to Lee Aggers at the National Mapping Division of the USGS in Denver. Thanks to all who participated in the "A-16 process". ■

What is a Cartographic Feature File?

by Darl Enger, USFS

The Cartographic Feature File (CFF) is a data file containing digital representation of all features, except contours, from a Forest Service Primary Base Series (PBS) map. Features are represented as line strings and points in ground coordinates with attribute information attached. Thematic layers, or items in a CFF include transportation, drainages and surface water locations; political and administrative boundaries; Public

Land Survey System, Forest Service and other land ownership; and cultural features, including buildings, airports, fences, dams, campgrounds, etc. Symbols, text and map color information are not included. Elevation data from a PBS map is prepared in a separate digital data file, called a Digital Elevation Model (DEM). The U.S. Geological Survey (USGS) and the Forest Service Geometronics Service Center (GSC) will jointly complete the DEM program in 1993 for National Forest lands.

The Forest Service PBS maps are developed from the USGS 7½ minute topographic map series with periodic revisions and enhancements added. Both the PBS maps and the CFF are constructed to National Map Accuracy Standards. The standards require showing 90% of well-defined features, within .02" of their true location (40 feet on a 1:24,000 map). Accuracy is sufficient to reproduce features within .005" of their location on the source map. CFFs are not topological structures. The file contains no information on the relationship between features. However, where like features intersect on the map, a node is digitized to make later creation of topology easy. Coincident features (two or more features occupying the same position, such as a road and a pipeline) are digitized only once. But the feature header file contains multiple attribute codes corresponding to the features represented by the line. This allows the CFF to be separated into multiple thematic data layers. The GSC in Salt Lake City provides this service, with five standard layers or up to 31 possible layers. GIS users will generally want to add some more attributes to the features before building the topology. Little or no user interaction should be required.

Cartographic Feature Files may be ordered from the GSC in ARC/INFO, MOSS, CFF, and Intergraph Design File formats. Data can be supplied in either State Plane or Universal Transverse Mercator coordinates on nine-track tape or floppy disk. In many cases, a local Forest Service office may be able to work with a user, such as a state agency, to provide a copy of their CFFs. Optionally, the USGS receives the CFFs and the data may be ordered from them as Digital Line Graph files.

There are over 1000 CFF quads slated for production in Montana. Of those, 393 are currently available.

For a more complete description of CFF, see *Cartographic Feature Files: A Synopsis for the User* by Carolyn K. Holland. Most of the above information was extracted from Holland's article. For more CFF information, call Darl Enger (406)329-3324, or order the document *Engineering Management 7140-21* from the Division of Engineering, USDA Forest Service, Washington, D.C., phone (202)205-0820. ■

Nature Preserve Representativeness

Identification of significant sites and assessment of the representativeness of sets of preserves are important objectives in nature conservation. The Montana Natural Heritage Program recently used GIS combined with a rule-based model in a unique way to assess nature preserve representativeness in a 450,000 acre study area along the upper Blackfoot River.

The basic question addressed was: "Do the nature preserves represent the full range of bioenvironments in the study area?". The key climatic and soil attributes hypothesized to have the most direct influence on plant species growth and survival (i.e., moisture regime, temperature regime, soil fertility) were aggregated in a rule-based bioenvironmental classification of 15,500 grid points. Model inputs were elevation, slope, and aspect values obtained from a digital elevation model, and soil water holding capacity and nutrient supply indices from the U.S. Soil Conservation Service's STATSGO database.

A map of bioenvironmental types was generated and the representation of these types in existing preserves was evaluated. The study found that although 32% of the study area is protected, 96% of the protected acreage is indicated as cold limited and 98% of the unprotected acreage is indicated as water limited.

In short, the existing preserve network in the upper Blackfoot River area appears to represent cold environments very well but represents water limited environments very poorly. For more information about this project, contact: Rob DeVelice, Natural Heritage Program, 1515 East Sixth Ave., Helena, MT 59620, (406) 444-2817. ■

MOSS User's Workshop

The eighth annual *MOSS User's Workshop* will be held December 9-13, at the Montana State University. The workshop will be hosted by the U.S. Bureau of Land Management. The emphasis this year is to share unique or innovative processes.

There will be panel discussions, as well as workshops and a poster session. A MOSS workstation will be set up and can be reserved for hands-on explanation or clarification of techniques.

For more information, contact: U.S. Bureau of Land Management, GIS User Support Section SC-344C, Denver Federal Center, Building 50, Denver, CO 80225, (303)236-0102 ■

Courses Offered at CALMIT

The Center for Advanced Land Management and Information Technologies (CALMIT), announces training courses using ERDAS and ARC/INFO to be offered in 1992.

The introductory GIS course uses techniques for building spatial data sets, performing spatial analysis, and modeling using ERDAS. Introductory PC ARC/INFO will give the user experience in processing vector data.

An Advanced GIS course emphasizing technical considerations, hardware, and advanced topics will also be taught. In addition courses will be offered in Image Processing and GIS and Remote Sensing for Water Resources.

For more information, contact: CALMIT / Attn: Chris Keithy, Conservation and Survey Division, University of Nebraska, 113 Nebraska Hall, Lincoln, NE 68588-0517, Telephone: (402)472-2565, FAX: (402)472-2410 ■

U of M to Acquire Digital Data for Taxation Project

The Montana Department of Revenue (DOR) has contracted with the University of Montana to assist in implementing a new method of taxation on private commercial forest land in Montana. The University will use biophysical models, digital elevation models, and Landsat Thematic Mapper satellite imagery to develop maps and GIS databases for potential forest productivity and delineation of forested areas. The Public Land Survey System (township, range, and section) will be mapped to overlay on these thematic maps using U.S. Geological Survey 7½ minute quadrangle series (1:24,000). These will be purchased in Digital Line Graph format where available, and the remainder will be digitized.

The DOR is also interested in overlaying an up-to-date map of federal, state, and county roads, navigable rivers and streams, railroads and transmission corridors at a scale of 1:15,840. The land area covered by this study includes roughly 1,300 to 1,600 townships or 45%-50% of the state.

Some of the digital data for the project may be obtained from the Department of Transportation (DOT), in exchange for road and stream vectors derived from a classified TM image mosaic of 23 images.

A total of 23 Landsat scenes, of the 33 that cover the entire state, are already being purchased by the DOR for other aspects of the project, representing $113,000 in data acquisition costs. The images being purchased are from August 1991.

The labor involved in analyzing and classifying the imagery and deriving road locations is much less than the labor costs to edit the resulting road and river vector files. However, the classified satellite image will not allow roads to be identified by surface type or class (i.e., a federal highway cannot be distinguished from a county road).

For more information on the GIS aspects of this project, contact:

Ken Wall
School of Forestry
University of Montana
Missoula, Montana 59812
(406) 243-2449.■

FOURTH ANNUAL MONTANA GIS CONFERENCE

December 3 - 5, 1991

Holiday Inn and GranTree Inn Bozeman, Montana

For information, call:
John Wilson
(406) 994-6907

- December 3-5, **Montana GIS Conference**, Bozeman, Montana. Call 406-994-5684.
- December 4, **Technical Working Group**, Bozeman, Montana. Call 406-444-5354.
- December 9-13, **MOSS User's Workshop**, Bozeman, Montana. Call 303-236-0102.
- March 23-26, **Canadian Conference on GIS**, Ontario, Canada. Call 613-224-9851.
- February, **Technical Working Group**, Helena, Montana. Call 406-444-5354.
- February 9-14, **GIS '92 - 6th Annual Symposium**, Vancouver, British Columbia. Call 604-688-0188.
- April 18-21, **AAG Annual Meeting**, San Diego, California. 202-234-1450.
- May 4-7, **1992 MidAmerica GIS Consortium**, Kansas City, Missouri. Call 913-864-3284.
- May 11-13, **GIS World Annual Conference**, Denver, Colorado. Call 303-223-4848.

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